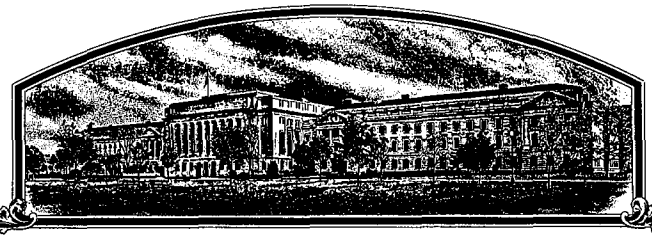

No. 9300109

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Pioneer Hi-Bred International, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

CORN

'PHHH9'

In Testimony Whereof, *I have hereunto set my hand and caused the seal of the* Plant Variety Protection Office *to be affixed at the City of* Washington, D.C. *this* 31st *day of* August *in the year of our Lord one thousand nine hundred and* ninety-three.

Attest:

Kenneth B. Evans

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

FORM APPROVED: OMB 0581-0055, Expires 1/31/91

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order determine if a plant variety protec certificate is to be issued (7 U.S.C. 24 Information is held confidential u certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) *(as it is to appear on the Certificate)*
Pioneer Hi-Bred International, Inc.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO.

3. VARIETY NAME
PHHH9

4. ADDRESS *(street and no. or R.F.D. no., city, state, and ZIP)*
Plant Breeding Division
North America Department of Corn Breeding
PO Box 85
Johnston, IA. 50131-0085

5. PHONE *(Include area code)*
515/270-3300

FOR OFFICIAL USE ONLY

PVPO NUMBER
9300109

FILING Date: 2/3/93
Time: ☐ A.M. ☐ P

FEES RECEIVED
Filing and Examination Fee: $2150.00 + 175.00
Date: 2/1/93 + 7/22/93
Certificate Fee: $275.00
Date: July 26, 1993

6. GENUS AND SPECIES NAME
Zea Mays

7. FAMILY NAME *(Botanical)*
Gramineae

8. CROP KIND NAME *(Common Name)*
Corn

9. DATE OF DETERMINATION
February 1989

10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION *(Corporation, partnership, association, etc.)*
Corporation

11. IF INCORPORATED, GIVE STATE OF INCORPORATION
Iowa

12. DATE OF INCORPORATION
May 6, 1926

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS
Dr. Bruce D. McBratney
Plant Breeding Division
Pioneer Hi-Bred International, Inc.
PO Box 85, Johnston, IA. 50131-0085
PHONE *(Include area code)*: 515/270-3546

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(Follow INSTRUCTIONS on reverse)*

- a. ☒ Exhibit A, Origin and Breeding History of the Variety.
- b. ☒ Exhibit B, Novelty Statement.
- c. ☒ Exhibit C, Objective Description of Variety.
- d. ☒ Exhibit D, Additional Description of Variety.
- e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.
- f. ☒ Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office 1/29/93
- g. ☒ Filing and Examination Fee ($2,150) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See section 83(a) of the Plant Variety Protection Act.)*
☐ YES *(If "YES," answer items 16 and 17 below)* ☒ NO *(If "NO," skip to item 18 below)*

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☐ YES ☐ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ YES *(If "YES," through* ☐ Plant Variety Protection Act ☐ Patent Act. Give date _____ .)
☒ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?
☐ YES (If "YES," give names of countries and dates)
☒ NO

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT *(Owner(s))*	CAPACITY OR TITLE	DATE
Pioneer Hi-Bred International Inc.		
Bruce D. McBratney	Technical Support Coord.	January 29, 199

14A. Exhibit A. Origin and Breeding History

Pedigree: PHJ29/PHBT4)X4112211113

Pioneer Line PHHH9 Zea mays L., a yellow corn inbred, was developed by Pioneer Hi-Bred International, Inc. from the single cross PHJ29 x PHBT4 using the pedigree method of breeding. The progenitors of PHHH9 are proprietary inbred lines of Pioneer Hi-Bred International, Inc. Selfing and selection were practiced within the above F1 cross for 4 generations in the development of PHHH9 at Princeton, Indiana. During line development, crosses were made to inbred testers for the purpose of estimating the line's combining ability. Yield trials were grown at Princeton, Indiana, as well as other Pioneer research stations. After initial testing, additional hybrid combinations have been evaluated and subsequent generations of the line have been grown and hand-pollinated with observations made for uniformity.

PHHH9 has shown uniformity and stability for all traits as described in Exhibit C - "Objective Description of Variety". It has been self-pollinated and ear-rowed 8 generations with careful attention paid to uniformity of plant type to assure genetic homozygosity and phenotypic stability. The line has been increased both by hand and in isolated fields with continued observations for uniformity.

No variant traits have been observed or are expected in PHHH9.

The criteria used in the selection of PHHH9 were yield, both per se and in hybrid combinations; kernel size, especially important in production; ability to germinate in adverse conditions; number of tillers, especially important in production because having numerous tillers increases hybrid production costs spent on detasseling; disease and insect resistance; pollen yield; tassel size; pollen shed duration.

DEVELOPMENTAL HISTORY FOR PHHH9

SEASON/YEAR	INBREEDING LEVEL
Summer 1984	F0
Winter 1985	F1
Summer 1985	F2
Summer 1986	F3
Summer 1987	F4
Winter 1988	F5*
Summer 1988	F6
Winter 1989	F7
Summer 1989	F8
Summer 1990	F9
Winter 1991	F10
Summer 1991	F11
Winter 1992	F12
Summer 1992	F13**

*PHHH9 was selfed and selected through F5 generation.

**PHHH9 was selfed and ear-rowed from F6 through F13 generation.

14B. Exhibit B. Novelty Statement

PHHH9 is most similar to the Pioneer Hi-Bred International, Inc. proprietary inbred line PHJ65 (PVP Certificate No. 9000245). PHHH9 sheds approximately 130 (1540 vs 1670) growing degree units earlier and silks approximately 130 (1580 versus 1710) growing degree units earlier than PHJ65. PHHH9 has dark green leaves, no marginal leaf waves and light leaf sheath pubescence whereas PHJ65 has very dark green leaves, few marginal leaf waves and heavy leaf sheath pubescence. PHHH9 has 7 lateral tassel branches whereas PHJ65 has 20 lateral tassel branches. PHHH9 has pink silk color and long ear husk extension whereas PHJ65 has green silk color and very long ear husk extension. PHHH9 has a red cob, PHJ65 a white cob.

PHHH9 has lower grain harvest moisture and higher test weight than PHJ65. PHHH9 is shorter with lower ear placement and flowers (GDU shed and GDU silk) earlier than PHJ65. PHHH9 has a lower early stand count compared to PHJ65. PHHH9 has better staygreen than PHJ65.

EXHIBIT C

VARIETY DESCRIPTION INFORMATION

INBRED = PHHH9

Type: Dent Region Best Adapted: SOUTHEAST

A. Maturity: Average across maturity zones. Zone : 0

Heat Unit Shed: 1540
Heat Unit Silk: 1580
No. Reps: 54

$$\text{HEAT UNITS} = \frac{[\text{Max.Temp. } (\leq 86^{\circ}\text{F.}) + \text{Min. Temp } (\geq 50^{\circ}\text{F.})]^{*}}{2} - 50$$

* If maximum is greater than 86 degrees fahrenheit, then 86 is used and if minimum is less than 50, then 50 is used. Heat units accumulated daily and can not be less than 0.

B. Plant Characteristics:

Plant height (to tassel tip): 225 cm
Length of top ear internode: 12 cm
Number of ears per stalk: SINGLE
Ear height (to base of top ear): 68 cm
Number of tillers: NONE
Cytoplasm type: NORMAL

C. Leaf:

Color: (B14) DARK GREEN
Angle from Stalk: <30 degrees
Marginal Waves: (HY) NONE
Number of Leaves (mature plants): 19
Sheath Pubescence: (W22) LIGHT
Longitudinal Creases: (OH56A) FEW
Length (Ear node leaf): 80 cm
Width (widest point, ear node leaf): 10 cm

D. Tassel:

Number lateral branches: 7
Branch Angle from central spike: 30 - 40 degrees
Pollen Shed: Medium based on Pollen Yield Test
(114% of experiment means)
Peduncle Length (top leaf to basal branches): 18 cm
Anther Color: YELLOW
Glume Color: GREEN

E. Ear (Husked Ear Data Except When Stated Otherwise):

Length: 14 cm
Weight: 142 gm
Mid-point Diameter: 46 mm
Silk Color: PINK
Husk Extension (Harvest stage): LONG (5 - 10 cm Beyond Ear Tip)
Husk Leaf: MEDIUM (8 - 15 cm)
Taper of Ear: SLIGHT
Position of Shank (dry husks): UPRIGHT
Kernel Rows: STRAIGHT DISTINCT Number = 17
Husk Color (fresh): LIGHT GREEN
Husk Color (dry): BUFF
Shank Length: 13 cm
Shank (No. of internodes): 9

F. Kernel (Dried):

Size (from ear mid-point)
Length: 12 mm
Width: 9 mm
Thick: 5 mm
Shape Grade (% rounds): 40 - 60 (46% medium round based on Parent Test Data)
Pericarp Color: COLORLESS
Aleurone Color: HOMOZYGOUS YELLOW
Endosperm Color: YELLOW
Endosperm Type: NORMAL STARCH
Gm Wt/100 Seeds (unsized): 37 gm

G. Cob:

Diameter at mid-point: 25 mm
Strength: STRONG
Color: RED

H. Diseases:

Corn Lethal Necrosis (MCMV=Maize Chlorotic Mottle Virus and MDMV=Maize Dwarf Mosaic Virus): INTERMEDIATE
Maize Dwarf Mosaic Complex (MDMV & MCDV=Maize Dwarf Virus): SUSCEPTIBLE
Anthracnose Stalk Rot (C. graminicola): INTERMEDIATE
S. Leaf Blight (B. maydis): RESISTANT
Carbonum Leaf Blight (H. carbonum): HIGHLY RESISTANT
N. Leaf Blight (E. turcicum): INTERMEDIATE
Common Rust (P. sorghi): RESISTANT
Southern Rust (P. polysora): INTERMEDIATE
Gray Leaf Spot (C. zeae): INTERMEDIATE
Stewart's Wilt (E. stewartii): RESISTANT
Goss's Wilt (C. nebraskense): INTERMEDIATE
Common Smut (U. maydis): HIGHLY RESISTANT
Head Smut (S. reiliana): SUSCEPTIBLE
Fusarium Ear Mold (F. moniliforme): INTERMEDIATE

I. Insects:

European Corn Borer-1 Leaf Damage (Pre-flowering): INTERMEDIATE
European Corn Borer-2 (Post-flowering): INTERMEDIATE

The above descriptions are based on a scale of 1-9, 1 being highly susceptible, 9 being highly resistant.

S (Susceptible): Would generally represent a score of 1-3.
I (Intermediate): Would generally represent a score of 4-5.
R (Resistant): Would generally represent a score of 6-7.
H (Highly Resistant): Would generally represent a score of 8-9. Highly resistant does not imply the inbred is immune.

J. Variety Most Closely Resembling:

Character	Inbred
Maturity	PHJ65
Usage	PHJ65

PHJ65 (PVP Certificate No. 9000245) is a Pioneer Hi-Bred International, Inc. proprietary inbred.

Data for Items B, C, D, E, F, and G is based primarily on a maximum of 4 reps from Johnston, Iowa grown in 1991 and 1992, plus description information from the maintaining station.

EXHIBIT D. ADDITIONAL DESCRIPTION OF PHHH9.
INBRED PER SE YIELD TEST COMPARISON OF PHHH9 AND PHJ65 EVALUATED OVER THREE YEARS.

VARIETY #1 - PHHH9
VARIETY #2 - PHJ65

* = 10% SIG + = 5% SIG # = 1% SIG

YEAR	VAR #	BU ACR ABS	BU ACR %MN	MST ABS	TST WT ABS	BAR PLT ABS	PLT HCM ABS	EAR HCM ABS	SDG VGR ABS	EST CNT ABS	DRP EAR ABS	GDU SHD ABS	GDU SLK ABS	GRN APP ABS	STA GRN ABS	STK LDG ABS	RT LDG ABS	BRT STK ABS
90	1						232.4	80.0	5.4	37.9		1569	1616		6.3			100.0
	2						259.1	80.0	4.3	39.7		1681	1751		6.7			100.0
	LOCS						2	2	4	7		9	9		3			1
	REPS						2	2	5	11		12	12		3			1
	PROB						.258	.000#	.078*	.413		.003#	.000#		.667			
91	1					58.3	232.2	80.3	5.7	34.0		1545	1591		6.0		100.0	
	2					81.8	260.1	86.6	5.0	34.6		1675	1727		4.7		47.8	
	LOCS					1	5	5	3	13		13	13		3		1	
	REPS					1	7	7	3	38		18	18		3		1	
	PROB						.049+	.085*	.423	.389		.000#	.000#		.057*			
92	1			14.9	62.7	100.0	206.1	83.2	3.6	24.3		1469	1501	7.0	6.3			
	2			17.6	58.5	73.9	239.7	87.3	4.0	31.6		1417	1430	7.5	5.7			
	LOCS			1	1	2	4	4	8	15		12	12	1	3			
	REPS			2	2	2	5	5	8	41		16	16	2	3			
	PROB					.248	.023+	.397	.623	.014+		.680	.600		.742			
TOTAL SUM	1			14.9	62.7	86.1	222.7	81.3	4.5	30.6		1524	1566	7.0	6.2		100.0	100.0
	2			17.6	58.5	76.5	252.5	85.7	4.3	34.3		1585	1629	7.5	5.7		47.8	100.0
	LOCS			1	1	3	11	11	15	35		34	34	1	9		1	1
	REPS			2	2	3	14	14	16	90		46	46	2	9		1	1
	DIFF			2.7	4.2	9.6	29.8	4.4	0.2	3.7		61	63	0.5	0.6		52.2	0.0
	PROB					.642	.000#	.076*	.608	.007#		.189	.208		.384			

8

DEFINITIONS

In the description and examples, a number of terms are used herein. In order to provide a clear and consistent understanding of the specification and claims, including the scope to be given such terms, the following definitions are provided:

BAR PLT = BARREN PLANTS. This is the percent of plants per plot that were not barren (lack ears).

BRT STK = BRITTLE STALKS. This is a measure of the stalk breakage near the time of pollination, and is an indication of whether a hybrid or inbred would snap or break near the time of flowering under severe winds. Data are presented as percentage of plants that did not snap.

BU ACR = YIELD (BUSHELS/ACRE). Actual yield of the grain at harvest adjusted to 15.5% moisture. ABS is in absolute terms and % MN is percent of the mean for the experiments in which the hybrid or inbred was grown.

DRP EAR = DROPPED EARS. This is a measure of the number of dropped ears per plot and represents the percentage of plants that did not drop ears prior to harvest.

EAR HT = EAR HEIGHT. The ear height is a measure from the ground to the top developed ear node attachment and is measured in centimeters.

EST CNT = EARLY STAND COUNT. This is a measure of the stand establishment in the spring and represents the number of plants that emerge on a per plot basis for the hybrid or inbred.

GDU SHD = GDU TO SHED. The number of growing degree units (GDUs) or heat units required for an inbred line or hybrid to have approximately 50 percent of the plants shedding pollen and is measured from the time of planting. Growing degree units are calculated by the Barger Method, where the heat units for a 24-hour period are:

$$GDU = \frac{(\text{Max. temp.} + \text{Min. temp.})}{2} - 50$$

The highest maximum temperature used is 86°F and the lowest minimum temperature used is 50°F. For each inbred or hybrid it takes a certain number of GDUs to reach various stages of plant development.

GDU SLK = GDU TO SILK. The number of growing degree units required for an inbred line or hybrid to have approximately 50 percent of the plants with silk emergence from time of planting. Growing degree units are calculated by the Barger Method as given in GDU SHD definition.

GRN APP. = GRAIN APPEARANCE. This is a 1 to 9 rating for the general quality of the shelled grain as it is harvested based on such factors as the color of the harvested grain, any mold on the grain, and any cracked grain. High scores indicate good grain quality and low scores indicate poor grain quality.

MST = HARVEST MOISTURE. The moisture is the actual percentage moisture of the grain at harvest.

PLT HT = PLANT HEIGHT. This is a measure of the height of the plant from the ground to the tip of the tassel in centimeters.

RT LDG = ROOT LODGING. Root lodging is the percentage of plants that do not root lodge; plants that lean from the vertical axis at an approximately 30° angle or greater would be counted as root lodged.

SDG VGR = SEEDLING VIGOR. This is the visual rating (1 to 9) of the amount of vegetative growth after emergence at the seedling stage (approximately five leaves). A higher score indicates better vigor and a low score indicates poorer vigor.

STA GRN = STAY GREEN. Stay green is the measure of plant health near the time of black layer formation (physiological maturity). A high score indicates better late-season plant health.

STK LDG = STALK LODGING. This is the percentage of plants that did not stalk lodge (stalk breakage) as measured by either natural lodging or pushing the stalks and determining the percentage of plants that break below the ear.

TST WT = TEST WEIGHT UNADJUSTED. The measure of weight of the grain in pounds for a given volume (bushel).

CLARIFICATION OF DATA IN EXHIBITS C AND D

Please note the data presented in Exhibit C, "Objective Description of Variety," is data collected primarily at Johnston, Iowa plus description information from the maintaining station. The data in Exhibit D, "Additional Description of Variety," is data from comparisons of inbreds or hybrids grown in the same tests in the adapted growing area of PHHH9.

14E. EXHIBIT E. Statement of the Basis of Applicant's Ownership

Pioneer Hi-Bred International, Inc., Des Moines, Iowa, is the employer of the plant breeders involved in the development and evaluation of PHHH9. Pioneer Hi-Bred International, Inc. has the sole rights and ownership of PHHH9.